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(54) CURABLE COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide curable compositions having excellent weatherability and heat resistance. SOLUTION: Curable compositions comprise an oxypropylene polymer whose polymer main chain has repeating units represented by the formula and which has at least one silicon atom-containing group having a silicon atom bonded to a hydroxyl group or a hydrolyzable group, an Mw/Mn of not greater than 1.6, and a number average molecular weight of not smaller than 6,000 and a hindered phenol based or hindered amine based antioxidant.

CH3

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CLAIMS

[Claim 1](A) A polymerization main chain. [Formula 1] CH₃ Claim(s)]

A -CH-CH2-0-

it is an oxypropylene polymer which has at least one silicon atom content group containing the silicon atom which came out, and contained the repeated unit shown and the hydroxyl group or the hydrotycle basis combined. The tractionality constituent in which MW/Mn contains the cospropylene polymer whose number, swerze molecular weight is 6,000 or more, and the (8) articoidant or less by

ingredient is 1.5 or less. [Claim 3](A) The hardenability constituent according to claim 1 or 2 whose number everage molecular Claim 21(A) The hardenability constituent according to claim 1 whose Mw/Mn of a polymer of an

weights of a polymer of an ingredient are 6,000–30,000. [Claim 4](A) A hardenability constituent given in any 1 paragraph of Claims 1–3 to which a silicon stom content group exists in molecular chain terminals in a polymer of an ingredient.

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DETAILED DESCRIPTION

Detailed Description of the Invention

Field of the Invention] This invention relates to the exprepylene polymer containing a reactive silicon group, and the new hardenability constituent containing an antioxidant.

hydrolytic basis combined, and can form a alloxane bond) oan turn into a liquefied polymer, is hardened at a room temperature with hygroscopic surface moisture etc., and produces a rubber-like nardaned material. For this reason, this polymer is used for the elastic sealant of the building, etc. which is a silicon atom content group containing the silicon atom which the hydroxyl group or the Description of the Prior Art The oxypropylene polymer which has a reactive silicon group (basis

which has the reactive silicon group which was excellent in weatherability, when the narrow thing of 0003]As a result of examining the hardenability constituent containing the oxypropylene polymer When using this polymer, in order to improve weatherability, heat resistance, etc. of a hardened material, it may be used as a constituent which added the antioxidant.

nolecular weight distribution was used as an oxypropylene polymer, this invention persons found out that weatherability and heat resistance were improved further, and resulted in this invention.

[Means for Solving the Problem and its Function](A) polymerization main chain a hardonability constituent of this invention, [Formula 2]

group) containing a silicon atom which came out, and containad a repesting unit shown and a hydroxyl notecular weight) contains an oxypropylane polymer whose number average molecular weight (Mn) is t is an oxypropylane polymer which has at least one silicon atom contant group (reactive silicon group or a hydrolytic basis combined. Mw/Mn (weight average molecular waight/number average 5,000 or more or less in 1.6, and the (B) antioxidant.

[Embodiment of the Invention]Although the reactive silleon group in particular as used in the field of this invention is not limited, if a typical thing is shown, a following general formula and the basis

expressed with ** 3 will be mentioned, for example, 19000

R¹ and R² among [type, All The alkyl group of the carbon numbers 1-20, the aryl group of the carbon numbers 8-20, When the Tori ORGANO siloxy group shown by the aralkyl group of the carbon

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JP,2001-019842,A [DETAILED DESCRIPTION]

numbers 7-20 or (R) "SiO- is shown and R¹ or two or more R² exist, they may be the same and may differ, R' is a univalent hydrocarbon group of the carbon numbers 1-20 here, and three R' may be the sams and may differ. X shows a hydroxyl group or a hydrolytic basis, and when two or mora X exists, they may be the same and may differ. As for a, 0, 1, 2, or 3b shows 0, 1, or 2, respectively. m pieces Formula 4

b which can be boiled and set may differ, m shows an integer of 0-19. However, a+sigma b>=1 shall

conventionally publicly known hydrolytic basis. Specifically, a hydrogen atom, a halogen atom, an 0007]A hydrolytic basis in particular shown by the above X is not limited, but should just be a

mate group, an amino group, an amide group, an aminooxy group, a sulfflydryl group, and an alkenyloxy group are preferred, especially alkoxy groups, auch as a viewpoint of hydrolysis natura being quiat and being easy to deal with it to a methoxy group, are preferred. [0008]1–3 of of this hydrolytic basis and hydroxyl group can be combined with one allicon atom, and, as for (a+sigmab), it is preferred that it is 1-5. When a hydrolytic basis and a hydroxyl group exist in alkoxy group, an acyloxy group, a KETOKISHI mate group, an amino group, an amide group, an acidamide group, an aminooxy group, a sulfitydryl group, an alkanyloxy group, etc. are mentioned, for example. Among these, although a hydrogen atom, an alkoxy group, an acyloxy group, a KETOKISHI two or more] a reactive silicon group, they may be the same and may differ.

0009]Although there may be one silicon atom and there may be two or more pieces in a reactive silicon group, in the case of a reactive silicon group with which a silicon atom was connected by siloxane bond etc. there may be about 20 pieces.

0010]a reactive silicon group expressed with a following general formula and ** 5 --- acquisition from an easy point, it is desirable. 901

-Si-x 13-B

(R2, X, and a are the same as the above among a formula).

cycloallyl groups, such as alkyl groups, auch as a methyl group and an ethyl group, and a cyclohoxyl siloxy group R' is indicated to be by 3SIO-which is a methyl group, a phenyl group, etc. (R'), etc. are (0012) As an exampla of R¹ in the above-mentioned general formula and ** 3, and R², For example, group, Arallyl groups, such as aryl groups, such as a phenyl group, and benzyl, the Tori ORGANO

molecule of oxypropylene polymers. If the number of the reactive silicon groups contained in one [0013]A reactive silicon group is good for 1.1-5 pieces to exist preferably in [at least one] one mentioned. Especially as R1, R2, and R1, a methyl group is preferred.

0014]A reactive silicon group may exist in an end of an oxypropylene polymer chain, and may exist in an inside. Since effective network chain density of an oxypropylene polymer component contained in a hardened material formed eventually will increase if a reactive silicon group exists in an end of a molecule of polymers will be less than one piece, hardenability will become insufficient and will secome difficult to reveal a good rubber elasticity action.

chain, a rubber-like hardened material in which a low elastic modulus is shown becomes is easy to be obtained by Nigh Intensity and high alongsten.

Nevatible, reproprient polymer which constitutes a polymerization main chain in a polymer of this in a polymer of this http://www4.ipdl.inpit.go.jp/cgi-bin/tran_web_cgi_ejje?atw_u=http%3A%2F%2Fwww4.ipdl.i... 2010/07/07

chain ahape, may be a letter of branching, or may be these mixtures. Although other monomeric units nay be included, it is preferred that 80 % of the weight or more of monomeric units expressed to ** 6 It comes out and the repeating unit shown is contained. This oxypropylene polymer may be straight

exist preferably 50% of the weight or more in a polymer.

of this invention, it is preferred to obtain by introducing a reactive silicon group into an oxypropylene 0017]As for an oxypropylene polymer which has a reactive silicon group which is the (A) ingredient (GPC) method is usually common. Thus, although a number average molecular weight is large, since preferably, and is 1.4 or less still more preferably. Although it is measurable with various kinds of molecular weight distribution is narrow, before hardening, viscosity is low, the constituent of this weight (Mn) of this oxypropylene polymer, what has a number average molecular weight of 6,000methods, the measurement of molecular weight distribution by a gel permeation chromatography 0016]Aithough 6,000 or more things are used effectively and get as a number average molecula 30,000 is good preferably. In this oxypropylene polymer, the ratio (Mw/Mn) of weight average nolecular weight and a number average molecular weight is 1.6 or less, and molecular weight distribution is very narrow (monodisperse nature is large). The value of Mw/Mn is 1.5 or less invention is easy handling, and a good rubber-like elasticity action is shown after hardoning. solymer which has a functional group.

caustic alkali) and this polymer of oxypropylene as a raw material, it can obtain by a method indicated to JP,61-197631A, JP,61-215622A, JP,61-215623A, JP,61-218632A, JP,46-27250.B, JP,59-15336.B, etc. which are the special polymerting methods. Since molecular weight distribution is in a tendency which spreads as compared with a polymer before introduction when a reactive silicon group is introduced, a thing narrow as much as possible of molecular weight distribution of a polymer eaction method which used the usual polymerizing method (anionic polymerization method using a 0018]Aithough molecular weight distribution is nerrow in the amount of Polymer Division and it is 0019]What is necessary is just to perform introduction of a reactive silicon group by a publicly very difficult to obtain an oxypropylene polymer which has a functional group by an elongation before introduction is preferred.

compound which has an active group and an unsaturation group which show reactivity to an oxygropylene polymer which has functional groups, such as a hydroxyl group, to this functional group (0020](1) Make hydrosilane which has a hydrolytic basis act on a resultant which made an organic 0021](2) Make a compound which has a functional group (henceforth Y'functional group) and a cnown method. That is, for example, the following methods are mentioned. react to an end, and was acquired by ranking second, and hydrosilylate.

eactive silicon group which show reactivity to an oxypropylene polymer which has functional groups henceforth Y functional group), such as a hydroxyl group, an spoxy group, and an isocyanate group, 0022]As a silicon compound which has this Yfunctional group, gamma-(2-aminocthyl) aminopropyl rimethoxysilane, gamma-(2-aminoethyl) aminopropyl methyl dimethoxysilane, Amino group content Sulfhydryl group content Silang, such as gamma-mercaptpropylmethyl dimethoxysilane; Gamma-Silang, such as gamma-aminopropyl triethoxysilane; gamma-mercapto propyltrimethoxysilane, sycidoxypropyltrimetoxysilane, Epoxysilane, such as beta-(3, 4-apoxycyclohexyl) this Y functional group react to an end.

socyanatepropyl triethoxysilane. Isocyanate content Silang, such as gamma-isocyanate propylmethyl 0023]Method ** which makes a compound which has a polymer, an isocyanate group, and a reactive ype unsaturation group content Silang [, such as gamma-acryloyloxypropylmethyldimothoxysilane,]; silicon group which have a hydroxyl group react to an end a method of (1) or among (2) in the above stryltrinethoxysilane; Vinyltriethoxysilane, gamma-methecryloyl oxypropyl trimethoxysilane, vinyl simethoxysilane; although hydro-Silang, such as methyl dimethoxysilane, trimethoxysilane, and - chlorine atom content Silang [. such as gamma-chloropropyltrimetoxysilane,]. -- gammamethyldiethoxysilane, is illustrated concretcly and they get, it is not limited to these.

0024](B) It is preferred for an antioxidant which is an ingredient to use a thing of a hindered phenol

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JP,2001-019842,A [DETAILED DESCRIPTION]

system and a hindered simina system. It is not limited by those although various things indicated to an actividant handbook of conspliction company issue, despeading, stabilization (the 256–242nd strainfolders) of the OMO Co., Ltd. issue of a polymer material, etc. see mentioned as those exemples. propionate, INT-hosa methylmekis (3,5-dr-t-butyl-4-hydroxy-hydrosalium kinner MMIDO) 35-dr-t-butyl-4-hydroxy-hydroxy-hydroxy-butyl-4-hydroxy-h 0025]Namely, as an antioxidant of a hindered phenol system, 2,6-di-tert-butyl-4-methyl phenol, 2,6bughydrouinon (25-d-tet-rank) the cloudous A tolking in gold in 19-d-tubel-5-tubel-4-bydrouphydrouinous (25-d-tubel-5-tubel-5-tubel-5-tubel-5-tubel-6 L-butyl-4-frydroxybenzyl)-isocyanurate, 2,4-screw [(octylthio) methyl]-O-cresol, N,N'-bis[3-(3,5-di-Lebuty-4-hydroxythenyl) propionyl hydraxie. This (2.4-di-t-buthylibenyl) phosphita, 2-(5-methyl-2-hydroxythenyl) percelased, 2-(2-hydroxy3-5-bakdyben and plas-demohrbarsythenyly-2-hydroxythenyl) beracelased, 2-(3.4-di-t-buty-2-hydroxythenyl) beracelased, 2-(3.4-di-t-buty-2-hydroxythenyl) experimental and 2-(3.4-di-t-buty-2-hydroxythenyl)-2-distorberase triasely. 2.4-di-t-buthylphenyl 3,5-di-t-butyl-4-hydroxy benzoate, Mark AO-30 which are the products made from ADEKAAGASU, IrganoxMD 1024 which is a product made from Mark AO-80;Ciba Geigy, Irganox il-tert-butyl-4-ethylphsnol, Mono(or JI or Tori) (alpha-methylbenzyl) phenol, 2,2'-methylenebis (4polyethylene glycol (molecular weight 300 [about]). Hydroxyphenyl benzotriazole derivatives, s 2-(3,5-di-t-butyl-4-hydroxybenzyl)-2-n-butylmalonic acid screw (1,2,2,6,6-pentamethyl 4-piperidyl), sthyl-8-tert-butylphenol), 2.2'-methylenabis (4-methyl-6-tert-butylphenol), 4,4'-butylidenebis (3-2-(3,5-di-t-amyl 2-hydroxyphenyl) benzotriazol, 2-(2'-hydroxy-5'-t-ootylphenyl) benzotriazol, A condensate with a methyl-3-[3-t-butyl-5-(2H-benzotriazol 2-yl)-4-hydroxyphany() propionate nethyl-6-tert-butylphenol). 4.4'-Thiobis (3-methyl-6-tert-butylphenol), 2.5-di-tert-

S. Isonox 129 which is a product made from Antioxidant HPM-12.Schenectady which is a product made from F.O.S.; SamilizerGM, SumilizerGA-80 which are the Sumitomo Chemical Go., Ltd. make,

VaugardXL-1 which is a product made from Uniroyal; in addition to this, [Formula 9]

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nexametrylene (Q. 2. 6, and 8-tetrametryl 4-piperloy) immo one). A NN-bis(3-aminopropylettylene diamine 2.4-screw [N-butyl-N-(1.2.2.6,6-pentametryl 4-piperioy) amino]-6-phloro-1,3,5-triszine [0026]Ae an entioxidant of a hindered unine system. The succinate dimetriol 1-(2-hotroxyethyl)-4-00x0xy 2, 2, and 6, evtermethylappiceling noptomederastion thing poly—[16-(1,13.9-textmexplancy] anino-1,35-triazine 2,4-60/4] and (22.86-textmetylately) ention 1,35-triazine 2,4-60/4] and (22.86-textmetylately) in the propertyly into 1 condensate, Bis(2,2,6,6-tetramethyl 4-piperidyl)sebacate, succinic acid-bis(2,2,6,6-tetramethyl 4product made from Ultranox 628; ADEKAAGASU which is a product made from Cyanox 1790;Borg PIPERIDINIRU)ester, Irgafos which is a product made from Ciba Geigy. Mark PEP-36 which is a Namer which is a product made from Sandstab P-EPQ;ACC which is a product made from 68;Sandoz; it is the Sumitomo Chemical Co., Ltd. make. [Formula 10]

used, it is proferred that they are 0.01–10 copies to reactive silicon group content oxypropylene xolymer 100 weight section (only henceforth a "part") which is the (A) ingredient, and it is still more 0027]Although there is no limitation in particular as amount of the above-mentioned antioxidant ogether and use two or more sorts. It is preferred to mix and use a thing of a hindered phenol preferred that they are 0.1-5 copies. An antioxidant may be used independently, and may use system and a thing of a hindered amine system especially.

morpholine, Amine compounds, such as N-methylmorpholine, 2-ethyl-d-methylmidszole, 1, and 8-diszabiospole (8,40) moteoner 70 logbl. or salf Line actions for did of these amenic compounds etc. 1.—low-moteoler 70 logy milde resist obtained from superhous polymine and polybasis and — 0028]in stiffening a constituent of this invention, even if it uses a curing catalyst, it is not necessary aluminum tris acetylacetonato. Organoaluminium compounds, such as aluminumtrisethylacetoacetate such as titanium tetra sostylacetonato,]; — lead octylate; — a butylamine. Octylamine, lauryl amine, and diisopropoxy aluminum ethylaoetoacetate; Zirconium tetra acetylacetonato, chelate compound ${f L}$ to carry out. When using a ouring catalyst, a publicly known thing can be used widely conventionally. As the example, thannac, disupplin dilaurate, such as technolunly Itanate and totropropy Itanate, Disubplim mates, disupplin discrete, orchio and fin, the nothorylate I such as neithferent and in I. — the exestent I of disupplin oxide and phthalis aster I — disupplin discrety sections. Frethylenetctramine, olaylamine, oyolohexylamine, Benzylamine, diethylamine propylamina, xyhylene diamine, triethylenediamine, guanidine, diphenylguanidine, 2,4,6-tris(dimethyl aminomethyl) phenol, resultant:gamma-aminopropyl trimethoxysilane of superfluous polyamine and an epoxy compound libuty! amine, monoethanolamina, Dicthanolamine, triethanolemine, dicthylenetriamine,

nore preferred. Since a cure rate will become slow and a hardening reaction will become fully difficult biblicly known silanol condensation catalysts, such as silanol condensation catalysts, such as silane naterial will become generation of heat and foaming local at the time of hardening arise, and is hard Imethoxysilane, an acid catalyst of further others, and a basic catalyst, etc. are mentioned. These to advance to a reactive silicon group content oxypropylene polymer if there is too little amount of [0029]As for the amount of these curing catalysts used, about 0.1-20 copies are preferred to 100 copies of reactive silion group content oxypropylene polymers, and its about 1-10 copies are still curing oatalyst used, it is not desirable. On the other hand, if there is too much smount of ouring patalyst used to a reactive silleon group content oxypropylene polymer, since a good hardened coupling agent; which has amino groups, such as N-(beta-aminoethyl) aminopropyl methyl satalysts may be used alone and may be used together two or more sorts.

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to be obtained, it is not desirable.

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titanium oxide, calcium carbonate, magnesium carbonate, talo, ferric oxide, a zinc oxide, a milt balloon Magnesium carbonate, diatomite, oalcination olay, clay, tale, titanium oxide, **** bulking agents, auch group content exypropylene polymers. When elongation wants to obtain a hardening constituent whic Of course, these bulking agents may be used only by one kind, and may carry out two or more kind oulking agents. As a bulking agent, fumes silica, sedimentation nature silica, a silicic acid anhydride, as bentonite, organio bentonite, ferric oxide, a zinc oxide, an active white, hydrogenation castor oil, "0031]To obtain a strong high hardening constituent with these bulking agents. Mainly Furnes silica result will be obtained if a bulking agent chosen from surface treatment detailed calcium carbonate. calcination clay, clay, an active white, etc. is used in 1–100 copies to 100 copies of reactive silicon eto, is used in 5-200 copies to 100 capics of reactive silicon group content oxypropylene polymers. 0030]The reactive silioon group content oxypropylene polymar can denaturaliza by mixing various hydrous silicic acids, and reinforcement nature bulking agent, calcium carbonate like carbon black, sedimentation nature silica, a silicic acid anhydride, hydrous silicic acids, carbon black, A desirable is size with low strength, A desirable result will be obtained if a bulking agent mainly chosen from and a milt balloon; asbestos, glass fiber, and a fibrous filler like a filament are illustrated.

arbitrarily in a form of two or more kinds of mixtures. A desirable result will be obtained if the amount 0032]In a hardenability constituent of this invention, since elongation of a hardened material can be phthalic ester, such as buty/benzy/ phthalate; Diocty/ adipate, **** aliphatic dibasic acid ester, such as succinio acid isodecyl and dibutyl sebacate; Diethylene glycol dibenzoate, **** glycol ester, such of plasticizers is used in 0-100 copies to 100 copies of reactive silicon group content exypropylene ncinolate; Tricresyl phosphate, **** phosphoric ester, such as trioctyl phosphate and phosphoric as pentaerythritol aster, Butyl oleate, **** aliphatic series ester species, such as methyl acetyl enlarged or a lot of bulking agents can be mixed if a plasticizor is used, using it together with a bulking agent, it is more effective. As this plasticizer, dicotyl phthalate, dibutyl phthalate, **** soid ootyldiphenyl; Epoxidized soybean oil, **** epoxy plasticizer [, such as epoxy stearic acid — polyester plasticizer [such as polyester of dibasio acid and dihydric alcohol,]; polychloroprene, polyisoprene, polybutene, and chlorinated paraffins, can use it independently polyether [such as a polypropylene glycol and its derivative,]; -- Polly alpha-methylstyrene. Polystyrene, such as polystyrene; plasticizers, such as polybutadiene, Butadiene Acrylonitrile,

temperature or heating using a mixer, a roll, a kneader, etc., or an ingrediant is dissolved using a little constituent of this invention, for example, was described above is blended, it kneads under ordinary polymers. [0033]An ingredient which limitation in particular does not have in preparation of a hardensbillty

suitable solvants, a usual method of mixing is adopted, end it gets. I liquid type and a two-componant compound can also be built and used by combining these Ingrediants suitably. [0034]If a hardanability constituent of this invention is exposed into the atmosphere, by operation of moisture, it will form network structure in three dimensions, and will harden it to a solid which has nbber-like elasticity.

is borrowed and it may stick to substrates of a ***** large area, such as glass, porcelain, wood, metal, a type. It is useful also as a food packaging material, a casting rubber material, a charge of templating suitably various additive agents, such as an adhesive improving agent, a physical-properties regulator 0036]Especially a hardenability constituent of this invention is useful as elastic sealant, and can be and a resin-molding thing, it is usable also as various seal constituents and adhesion constituents of used as seal agents, such as a building, a marine vessel, a car, and a road. Since, or help of a primer [0035])t faces using a hardenability constituent of this invention, and it is still more possible to add a preservation stability improving agent, lubricant, paints, and a foaming agent, if needed. naterial, and a paint.

weatherebility and heat resistance of a hardened material as compared with the constituent which Effect of the invention] The constituent of this invention becomes the thing excellent in the

0038]Although the reactive silloon group content oxypropylene polymer used as a (A) ingredient in the hardenability constituent of this invention has a large number everage molecular weight, its used the large polymer of molecular weight distribution as a (A) ingredient.

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nolecular weight distribution is narrow. Therefore, compared with tha constituent which contains the sistribution with the same molecular weight before hardening viscosity is low and tha constituent of anal reactive silican group content oxypropylene polymer with large molecular weight

constituent which workability could blend a lot of bulking agents, and it is not only good, but was 0039]Thus, since the viscosity before hardening ia low, the room-temperature-curing nature this invention is easy handling.

0040]Chemical resistance, such as acid resistance, is improved substantially unexpectedly, and the vater resisting property is also excellent.

0042]401 g (0.081 Eq) of polyoxypropylene triol (Mw/Mn=1.38, viscosity of 89 poise) of the molecular 0043]Decompression devolatilization was carried out, after dropping the 28% methanol solution 19.1g weight 15,000 was taught to synthetic 11.5 Lof example resisting pressure glass reaction vessels, Example In order to clarify this invention further, working example is hung up over below. and it carried out under a nitrogen atmosphere.

[0044] if decompression removal of the hexene is carried out after melting this resctant in hexene and (0.09) Eq) of soutism methoxide and making it react from a star finame lat 137 ** for 5 hours. It returned under a rinteger antenspiene, and the abyl chioride 50g (0.118 Eq) was further anylated using the 178 Eq) was further anylated using the 25g rections a solidon 5 Seg (0.029 Eq) and the abyl chioride 2.7g (0.035 Eq) of reading nethoxide, after making it react for 1.5 hours, dropping and

0045]270 g (0.065 Eq) of this polymer was taught to resisting pressure glass reaction vessels, and it serving out adsorption treatment with aluminum silicate — the yellow of 311 g — transparent oolymer was obtained (viscosity of 68 poise).

parried out under a nitrogen atmosphere. It agitated for 30 minutes after adding 0.075 ml of catalyst chloroplatinic acid. if it devolatilizes after adding 6.24 g (0.059 Eq) of dimethoxymethylsilane from a solutions (solution which melted ${\rm H_2PtCl_6}$ and ${\rm 6H_2O}$ 25g in the isopropyl alcohol 500g) of

tap funnel and making it react at 90 ** for 4 hours — the yellow of 260 g — transparent polymer was 0046]220 g (0.0447 Eq) of polyoxypropylene triol (Mw/Mn=1.38, viscosity of 89 poise) and 0.02 g of

after the end of dropping for 1.5 hours. The reaction was terminated, after measuring an IR spectrum synthetic example 2 agitator, 8.45 g (0.0447 Eq) of gamma-isocyanate propylmethyl dimethoxysilane was dropped at the room temperature under a nitrogen atmosphere. It was made to react at 75 ** iliauric acid dibutyltin of the number average molecular weight 15,000 are taught to a flask with and checking disappearance of the NCO absorption near 2280 cm⁻¹, and generation of the C=0

,000. After adding 40 g of sodium hydroxide and making it react at 60 ** for 13 hours, 19 g of bromo nethyl chlorides were made to react at 60 ** for 10 hours. (Mw/Mn of the obtained polymer was 2.1 pressure glass reaction vessels in which the nitrogen purge of the polyoxypropylane glycol 420g and absorption near 1730 cm⁻l, 213 g of wstar-white polymer was obtainsd. [0047]Example of comparison composition 1 number average molocular weight taught the resisting he number avorage molecular weight of 3,000 was carried out in 80 g of polyoxypropylene triol of

Then, the allyl chloride 15g was added and the reaction was performed for 36 hours. After ending reaction, decompression was used and the volatile substance was removed. and viscosity was 385 poise.)

the isopropyl alcohol 500g) of chloroplatinic acid, 12 g of dimethoxymethylsilane was added and it was 0048]Contents were taken out to the beaker and it melted in hexane. After carrying out adsorption resestment with aluminum silicates, decompression removal of the hozane was carried out. [049]JARen teaching 500 g of this polymen to the reaction vessel by which the introgen purges was earied out and adding 10.08 g of easilyst soultons (solution which melted H₂PHO₆ and 6H ₂O 25g in

2 rpm). GPC analyzad tha number svenage molecular weight (Mn) and molecular weight distribution Mw/Mn) of each polymer. GPC used the totrahydrofuran for the column filled up with polystyrena gei comparison composition was messured at 23 ** using the Brookfield viscometer (BM type rotor No.4, [0050]The viscosity of the polymer obtained in the synthetic sxamples 1 and 2 and the example 1 of made to react at 80 ** for 4 hours, if decompression is used and a volatile substance is removed aftar ending reaction — light yellow — 550g of transparent polymer was obtained.

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JP,2001-019842,A [DETAILED DESCRIPTION]

(made by TOSOH CORP.) as a distillate solvent, and analyzed it with the oven temperature of 40 ***.

[0051] [Tsble 1]	and	(10051) [Table 1]	
有	華 康 (本/火)	数字均分子量 (Nn)	分子量分布 (Mw/Mn)
合成例1	88	1. 8×10	1. 5
金成例2	150	1. 7×10	1. 4
比較合成	380	1. 8×104	2.3

comparative example 1 composition, or the example 1 of comparison composition, NOCRAC SP meda by Sankyo Co., Ltd. was added as one copy and a hindered amine system antioxidant, three copies of from Ouchi Shinko Chemical Industry as a hindered phenolic antioxidant One copy, SANORU LS770 compared with the constituent (thing using polymer of the example 1 of comparison composition) of INUVIN327 made from CIBA-GEIGY was kneaded uniformly. Among the obtained constituents, the constituent (thing using polymer of the synthetic example 1) of working example 1 had low viscosity 0052]As opposed to 100 copies of polymer obtained in working example 1 and the example 1 of octylic acid tin and 0.5 copy of Isuryl smine were added as one copy and a curing catalyst, and

the comparative example 1, and was easy handling. [0053]Aftor creating a 3-mm-thick sheet using these constituents, it was recuperated for three days by it, the surface dissolved the constituent of working example 1 for a while 720 hours afterward. On the other hand, the surface dissolved the constituent of the comparative example 1 for a while 480 at 50 more ** for two days at 23 **. When the sunshine WOM estimated this hardening constituent,

[0055]After creating a 3-mm-thick sheet using these constituents, it was recuperated for three days at 50 more ** for two days at 23 **. Whan the sunshine WOM estimated this hardening constituent, [0054]To 100 copies of polymer obtained in the example 1 of reference example composition, or the example 1 of comparison composition, three copies of octylic acid tin and 0.5 copy of lauryl amine were added, and it kneaded uniformly.

[0056]]t replaced with the polymer obtained in the exampla 1 of <u>working example 2</u> composition, and the hardenability constituent was obtained like working example 1 using the polymer obtained in the synthetic example 2. The hardened material of this constituent had the same outstanding by it, the surface dissolved all for a while 72 hours afterward. veatherability as the thing of working sxample 1.

Translation done.